NEWSLETTER OF THE ENGLISH HERITAGE RESEARCH DEPARTMENT

RESEARCH NEWS

Extensive sampling during the excavation on the Whitby Abbey Headland - story on page 8

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The articles in this latest issue of Research News again reflect the breadth of front-line research and capacity-building by Research Department's staff.

The work of the Archaeological Projects Team is highlighted by the excavations at Whitby and also at Carisbrooke Castle where excavation informed the establishment of a new garden area. The work of the Archaeological Survey and Investigation Teams on Exmoor and at Ascott Park, Oxon, demonstrates that new important discoveries across an immense chronological range in poorly understood and little examined landscapes are still possible in widespread areas of England. The EPPIC programme of placements has been running for some time, and articles in Research News have been written by EPPIC placement holders. Here Catherine Grindey gives her personal account of her experience on such a placement with Archaeological Survey and Investigation. The Archaeological Science Teams are featured conducting experimental archaeology on the production methods of Roman glass and its waste products, and also in producing guidelines on investigative conservation. Aerial Survey celebrate the production of a new book, and also trial new GPS equipment in the field, and the Archaeological Graphics Team record important sculpture at York Minster.

In London, the Survey of London Team are beginning work in Woolwich, and have begun to examine undervalued buildings in the area. In this issue a modern building whose architects worked on far more high-profile structures is placed into context. The Blue Plaques Team undertook research to commemorate figures associated with the abolition of the transatlantic slave trade, the bicentenary of which was marked in 2007. Where the rules of the scheme did not permit the erection of a plaque – only surviving buildings can be commemorated, not sites – their research effort has been put to positive use in other ways.

It is, perhaps a sign of the times that three articles examine the impact of coastal erosion on the eastern coast of England. The survey of the Martello towers on the south and east coasts, and the LiDAR survey at Whitby are both concerned with gathering information on the future implications of erosion on potentially threatened sites and landscapes. Excavation work on the cliff at Whitby is the last stage in a long-running programme of assessment and mitigation undertaken by the Archaeological Projects Team, and illustrates one of a suite of possible responses to such problems, as well as providing significant new evidence for the nature of settlement and activity on the site in the Iron Age and Anglian periods.

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Research and Standards Group

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The east coast Martello Towers: assessing the impact of coastal erosion

A new survey examining the iconic Napoleonic coastal defences, threatened by coastal erosion.

Coastal erosion is putting some of our most evocative structures on the wind-swept Essex and Suffolk coasts in great peril. The sandcastle-like Martello Towers were built between 1808 and 1812. They are monuments to a time when Britain was threatened by invasion by Napoleonic France. This danger soon passed and some towers were sold off for their building materials, while others were retained as Coastguard lookout posts and later some were incorporated into 20th century defence schemes.

In total 29 east coast towers were built between St Osyth, Essex and Aldeburgh, Suffolk, these are more robust than the south coast examples. The towers were part of a wider defensive landscape, with coastal batteries some of which dated back to the 1790s. The system pivots around a ten gun circular redoubt at Harwich. Here the Board of Ordnance also built a cement works that was probably used in the construction of the towers. A similar redoubt was proposed for Aldeburgh but it was deemed too costly to construct and instead a unique four gun quatrefoil tower was built.

This present survey of the towers follows on from similar investigations undertaken by the Ministry of Works in 1937 and the Department of the Environment in 1977. Eighteen of the towers still survive, although three are on the Buildings at Risk Register. Important discoveries from this survey include the recognition of earthwork traces of demolished towers, remnants of surrounding enclosures, Board of Ordnance boundary stones, and most significantly remains of the coastal batteries. Survey results will be used to inform future conservation strategies.

Jonathan Millward

Steve Cole, © English Heritage, NMR: DP046352

Martello Tower W, Bawdsey, Suffolk. The cost of each tower was originally estimated at £2000, the final cost was in excess of £20, 000

Pat Payne, © English Heritage, NMR: DP029604

Remains of Gun Battery B, Point Clear, Essex

Steve Cole © English Heritage, NMR: DP046366

Below: Martello Tower CC, Aldeburgh, Suffolk. This tower has a unique quatrefoil design

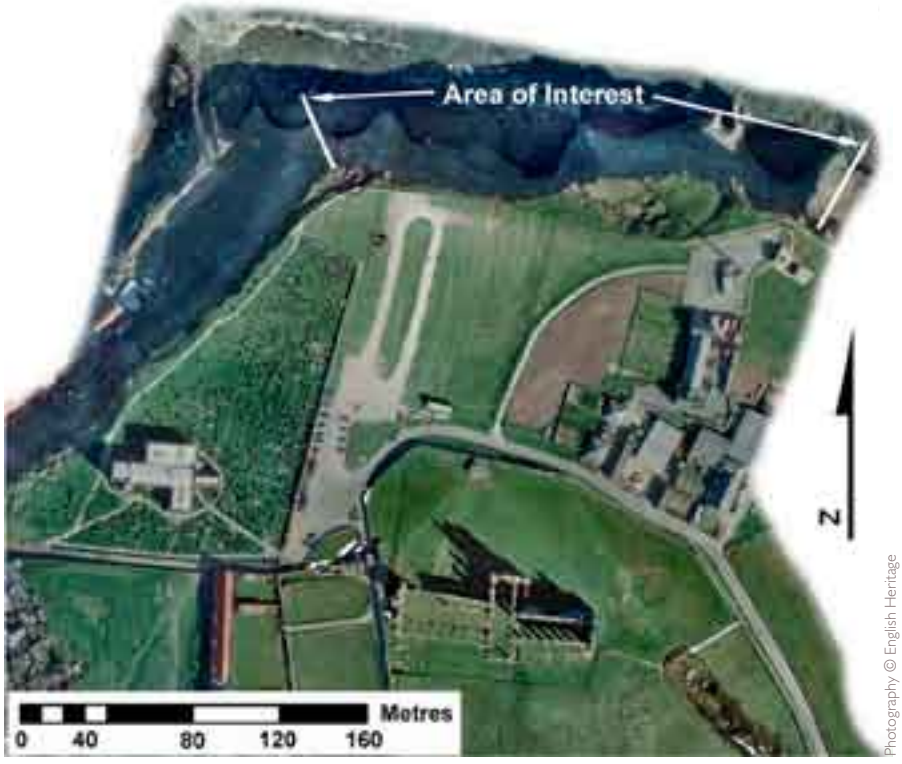
EAST COAST EROSION

Scanning for change: assessing coastal erosion at Whitby Abbey Headland

Continuing erosion of the Headland at Whitby has necessitated archaeological intervention. Here LiDAR techniques show their potential for assessing the threat.

Whitby Abbey occupies a prominent coastal headland above the town of Whitby, North Yorkshire, and is a renowned landmark of significant religious importance. This EH-managed site comprises not only the ruined abbey and the historic St Mary's Church and cemetery, but also an extensive area of cliff-top which is rich in archaeology (see following article). Coastal erosion has been a major concern at Whitby for some time. A significant cliff failure in 2000 necessitated emergency excavations, revealing rich archaeological deposits in the vicinity of the cliff-top (*CfA News 4*).

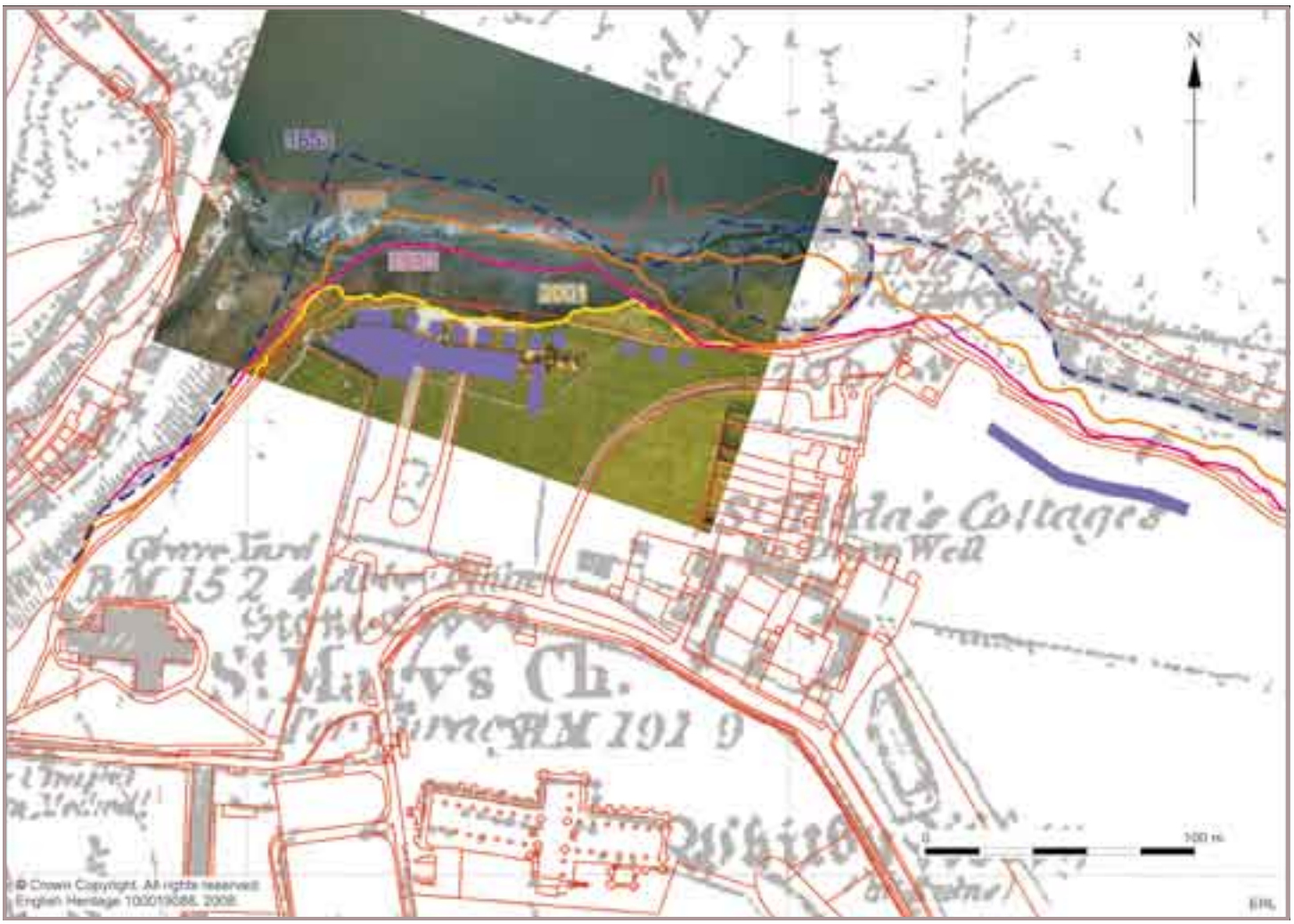
Given the continuing threat posed by erosion at Whitby, English Heritage Metric Survey Team, in partnership with the British Geological Survey, commissioned Newcastle University to carry out PhD research into this issue. This was aimed at developing an integrated approach to assessing coastal geohazards, and the threat that these pose to vulnerable coastal heritage sites such as Whitby. The research involved the fusion of a range of remote geomatics techniques, including terrestrial laser scanning, airborne laser scanning, and photogrammetry. This work is now complete, and this article provides a summary of key findings in relation to the Whitby Abbey site, with particular emphasis on the application of airborne laser scanning.



Whitby Abbey Headland, highlighting the region of interest

Laser scanning is a valuable technique for a number of heritage applications (*Research News 6*). While the majority of attention in the heritage sector to date has focused on the capabilities of terrestrial instruments, airborne laser scanning also has much to offer. In its airborne format, this technique is generally referred to as Light Detection And Ranging (LiDAR). The potential of LiDAR for detection of previously undiscovered or poorly interpreted archaeological sites has already been highlighted through the work of Simon Crutchley and the English Heritage Aerial Survey Team. However, this technique can also be of value, in a less direct manner, for evaluation of large scale heritage sites, as explained here.

LiDAR utilises a scanning laser instrument mounted on an aircraft to carry out high-density range measurements to the terrain surface. This enables rapid and remote acquisition of terrain measurements over large areas, and consequently, LiDAR is well-suited to a diverse range of mapping



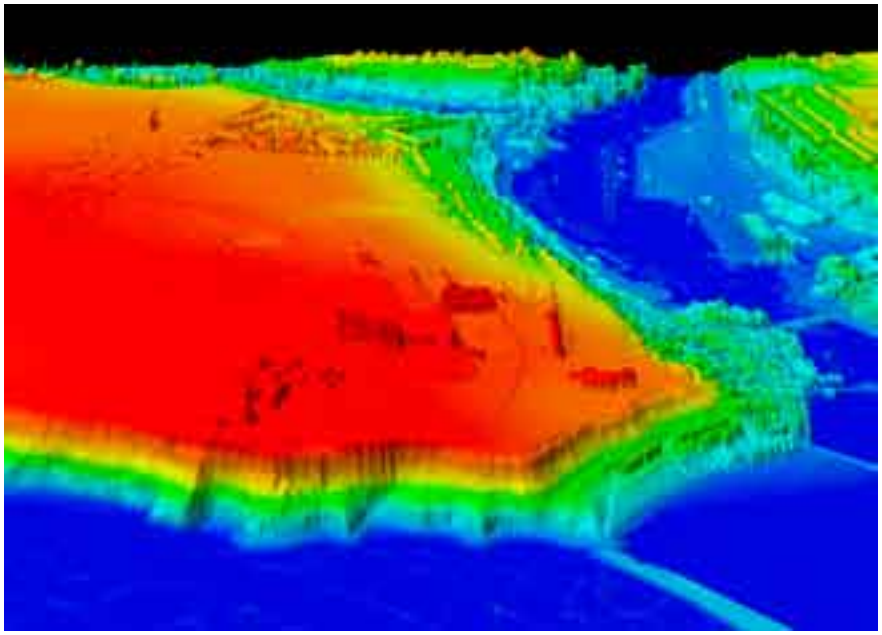
Eddie Lyons, © English Heritage

Map regression showing loss of cliff through erosion since 1853

applications. Although aerial photogrammetry is a well-established technique for coastal change monitoring, difficulties associated with poor image texture (e.g. shadows) can prevent successful measurement over significant portions of the image, especially where steep cliffs are present. In contrast, LiDAR is independent of solar illumination, and consequently is capable of providing a consistent representation of the terrain. LiDAR surveys of Whitby Abbey Headland were carried out in April 2005, August 2005 and May 2006 by the Natural Environment Research Council's Airborne Research and Survey Facility (NERC ARSF). The data was captured from a flying height of 1000 m, resulting in a spatial resolution of approximately 1 point/m^2.

In order to assess geohazard activity at Whitby, it was necessary to establish a historical context. This context was provided back to 1853 through a map regression exercise undertaken by Eddie Lyons of the Archaeological Graphics Team. More recent vertical aerial photography from 1986 and 1994 provided the most suitable coverage of the headland, and following photogrammetric processing, digital elevation models (DEMs) were produced. Processing of the LiDAR datasets also enabled derivation of DEMs for April 2005, August 2005, and May 2006. DEMs represent a three-dimensional model of the terrain surface, and by differencing multi-temporal DEMs it is possible to determine terrain change over time. As part of the research, software was developed in order to register multiple DEMs to a common reference system, thus minimising the possibility of registration error, which could otherwise contaminate subsequent change detection analysis. The software employs a surface matching algorithm which enables datasets to be registered in an automated manner, without the requirement for ground control points. This was particularly valuable in controlling the 1986 DEM, as due to extensive landscape change it would have proved virtually impossible to identify suitable control points for registration through conventional means.

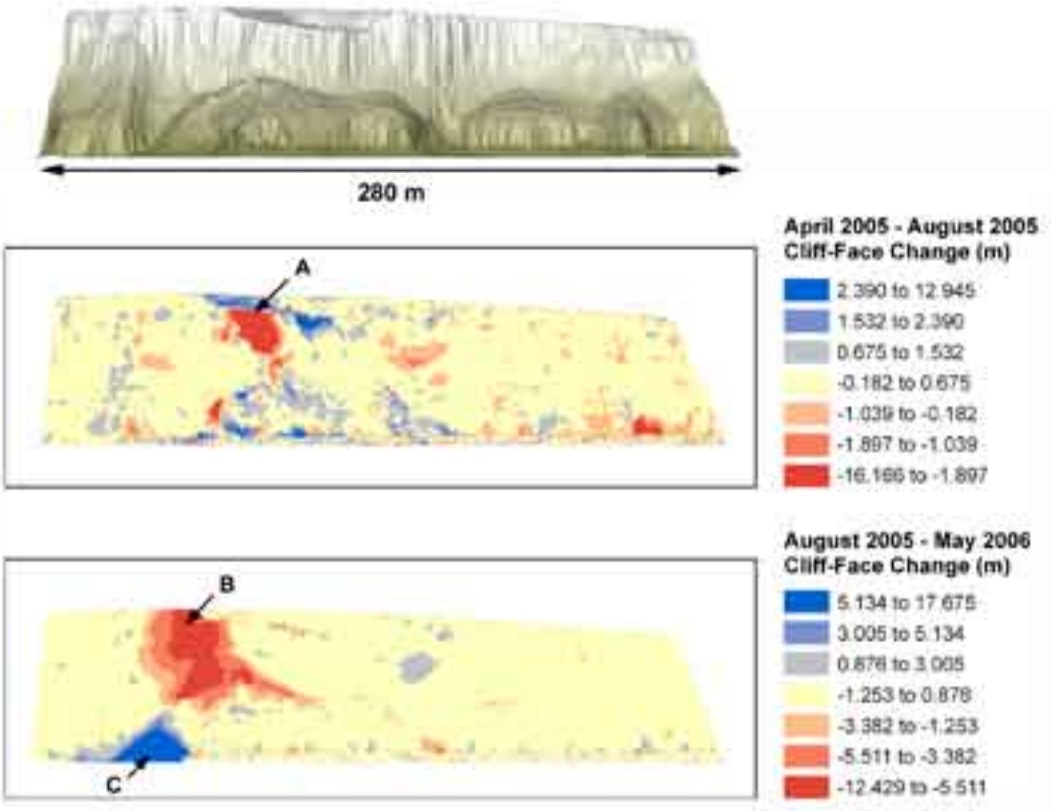
Following registration of the multi-temporal DEMs, the surfaces were differenced in such a way as to enable change to be analysed in a continuous manner across the cliff-face. Over these relatively short time intervals, it



Perspective view of a LiDAR digital surface model of Whitby Abbey Headland, derived from the April 2005 survey

is possible to identify individual regions of failure within the cliff-face. For instance, between April 2005 and August 2005, a notable failure has occurred over the upper portion of the cliff-face (see below, Feature A). It appears that this has developed further, with a more significant cliff failure evident at this location in the August 2005 – May 2006 change analysis (Feature B). It is likely that the failed debris has accumulated below (Feature C), explaining the region of positive change. Indeed, this activity was confirmed through a field visit in March 2007. This analysis suggests that in the hard rock cliffs of Whitby, failures may be spatially and temporally linked, with regions becoming weakened through relatively minor rockfall events, and consequently more susceptible to major failures thereafter. This underlines the potential value of extended monitoring surveys for effective early warning of failure events.

Using the historical datasets, further analysis was carried out in order to investigate cliff-top retreat. Although such an approach fails to communicate the spatial variability of erosion over the cliff-face as a whole, it does provide a tangible indication of the potential risk to cliff-top infrastructure. The cliff-edge positions were extracted from the DEM datasets, and imported to GIS software for further analysis, as illustrated in Fig 6. This highlights the nature of cliff-edge retreat over the twenty-year period 1986 – 2006. Although the western end of the cliff-top (A) has retreated by as much as 11 metres over this period, parts of the eastern end have undergone minimal retreat. Most recently, a large section of cliff-top (B) was lost due to the major cliff failure which occurred sometime between August 2005 and May 2006. Analysis indicates that the cliff-top is retreating at an approximate rate of 0.38 metres per annum. However, the cliff-face as a whole was found to be retreating at the slower rate of 0.22 metres per annum, suggesting that erosion is less active over



Results of change analysis for section of cliff-face

the lower parts of the cliff-face (this may be related to the installation of protective rock armour at the foot of the cliff in 2001).

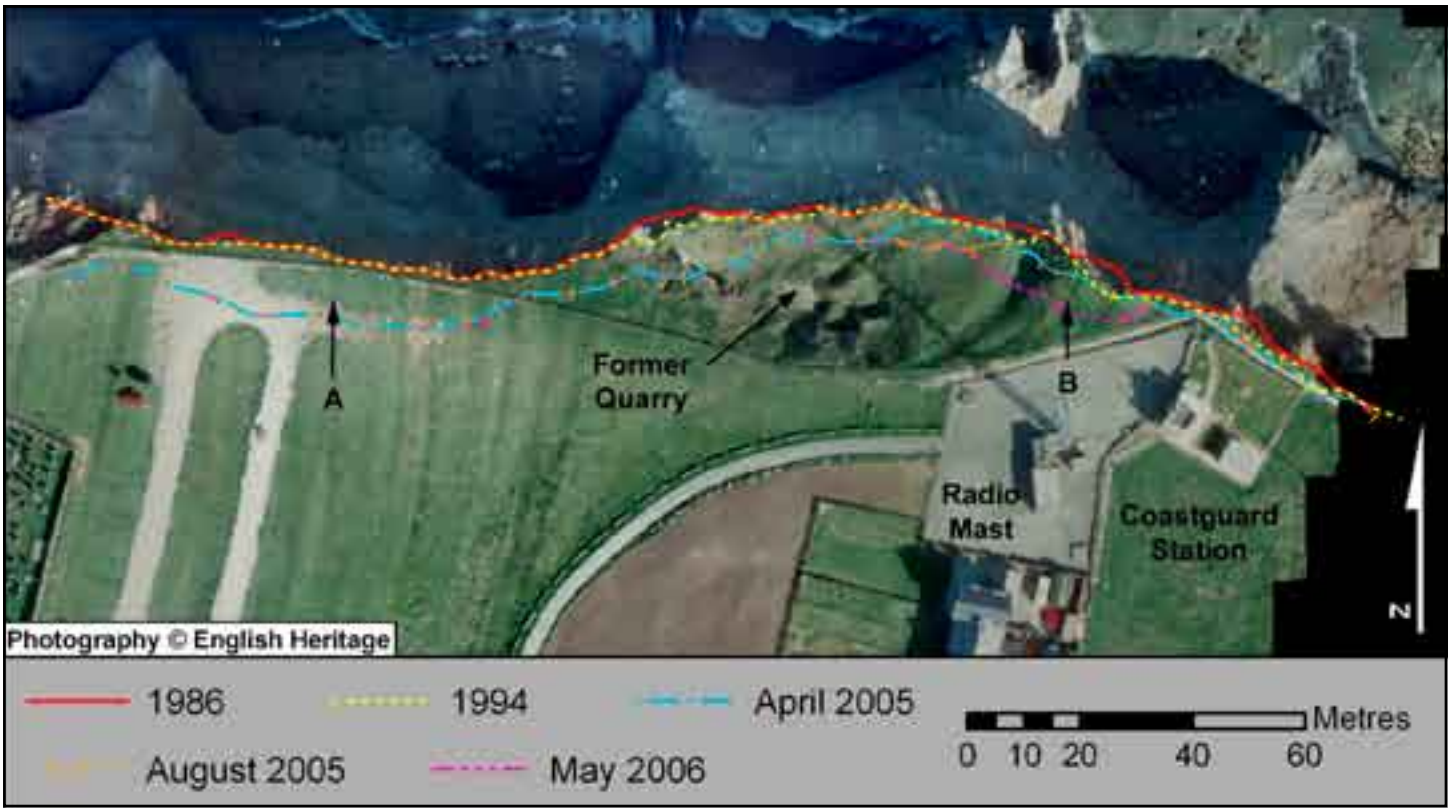
The strategy developed here has allowed for high resolution assessment of coastal geohazard activity, and analysis confirms that the seaward portion of Whitby Abbey Headland is actively eroding. However, coastal retreat at this location is unpredictable and highly variable in both space and time. Although this activity does not pose an immediate threat to the Abbey, other cliff-top infrastructure (such as the coastguard station), has a limited lifespan in the short-term. Furthermore, the current rate of cliff-top retreat would suggest that it is likely that buried cliff-top archaeology will continue to be lost to erosion at a relatively rapid pace.

This research has demonstrated the value of LiDAR for effective assessment of vulnerable coastal heritage sites. However this technique is not limited to coastal settings, but is applicable to any site for which high resolution topographic data is required over relatively large extents. In addition to topographic analysis, LiDAR also facilitates high quality visualisation and 3D modelling of both the natural and built environments. Like its terrestrial counterpart, it is likely that LiDAR will prove to be of growing relevance for a diversity of heritage applications. Although LiDAR datasets are often perceived as an expensive luxury, they are becoming increasingly available throughout the UK, and there is significant potential for data sharing.

Pauline Miller, Jon Mills (School of Civil Engineering and Geosciences at Newcastle University) and Paul Bryan

Failed cliff material corresponding to Feature C

Cliff-edge retreat 1986 – 2006



RESEARCH THEMES AND PROGRAMMES

A 2 D 4

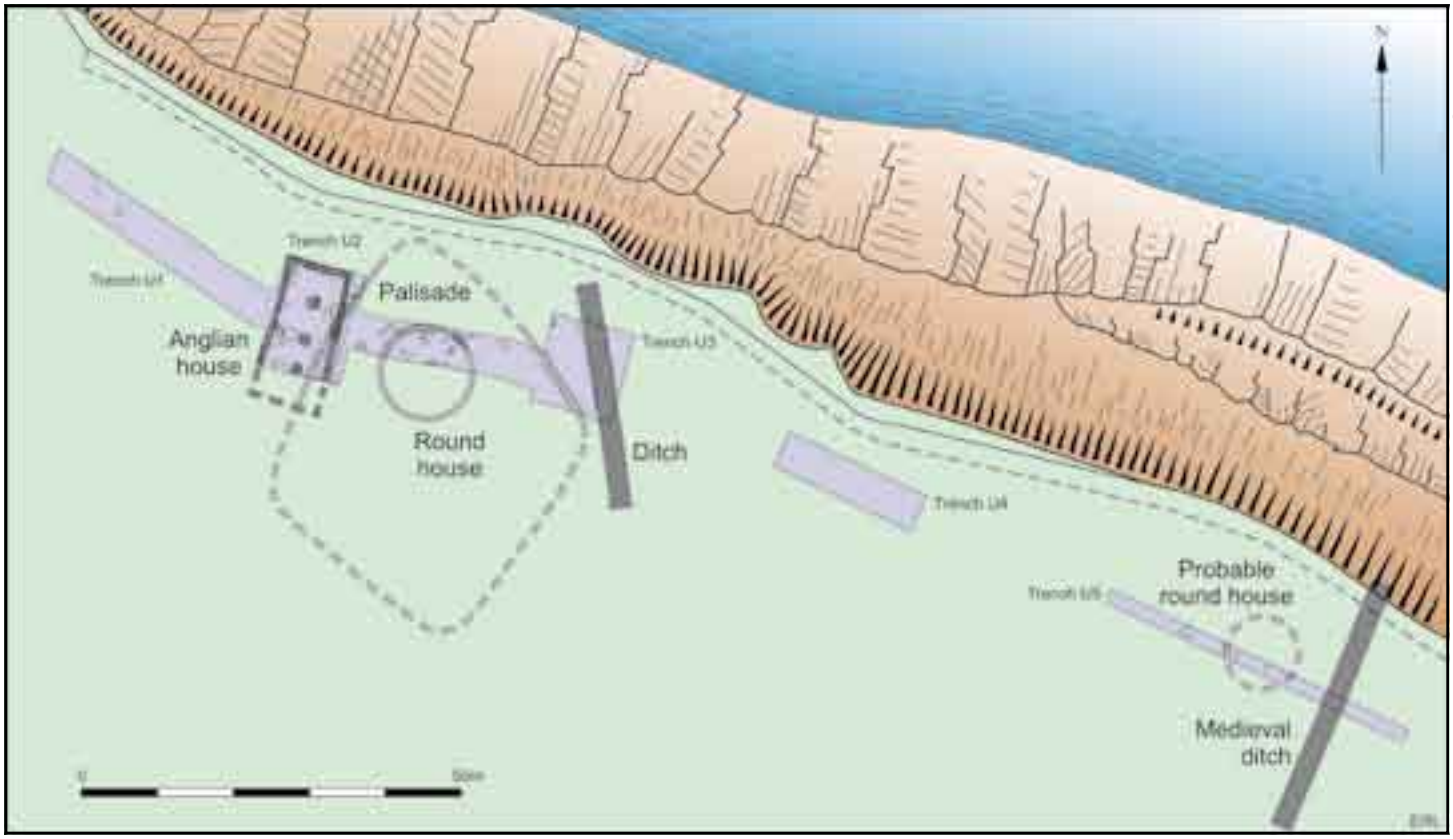
EAST COAST EROSION

Excavations on the Whitby Abbey Headland

The final stage of archaeological mitigation at Whitby reveals Prehistoric and Anglian settlement.

The erosion of the cliff edge at Whitby, described in the previous article, has necessitated a series of archaeological excavations aimed at rescuing, evaluating and finally mitigating the loss of archaeology (see *CfA News 4*). The final stage of this work was undertaken during September and October 2007. It was confined to the area at the eastern end of the area under short term threat and followed on from the 75m long test trench (U1) excavated in that area in 2002. Prior to 2002 this area had never been the subject of archaeological investigation and the initial work was to establish if there was any previous occupation on this part of the Headland. The results showed conclusively that there was occupation in both the Anglian (7th – 9th centuries) and Late Iron Age periods. The main elements revealed were the remains of Anglian structures and industrial debris, and an Iron Age round house with associated pits.

The objectives of our work in 2007 were to establish the extent of the Iron Age settlement along the line of the cliff to the east with the possibility of a physical boundary to the settlement, and to investigate further the densest area of Anglian activity where remains of burnt linear features and several large pits had been found in 2002. Four areas were opened up by machining down to the top of the medieval plough-soil horizon. The two trenches to the west (U2 and U3) were positioned in order to investigate further features revealed in 2002, while Trenches U4 and U5 were positioned to examine the



Plan showing the location of the trench and the main features. The dashed shading represents conjectural interpretation

Eddie Lyons © English Heritage

Tony Wilmott, © English Heritage

Trenches U3, U4 and U5 and the coastal path, looking east

extent of occupation to the east. All that remains of the archaeology in this area are features cut into the natural clay soil. All traces of occupation above this have been removed by centuries of medieval ploughing which has left pronounced ridge and furrow over the whole area.

Trench U2 (11m x 15m) extended to the north and south of the area where Anglian archaeology had been recorded in 2002. This enabled the character of the archaeology to be clarified and earlier occupation in the form of linear features was also recorded. The earliest feature was a curving trench which was very similar a feature found to the east in U3 and, like this, may also have been a palisade trench, probably associated with the Iron Age phase of occupation. In the Anglian period a large timber building was erected. The building measured 9.2m wide by at least 15m long with several stages of construction and development. The presumed southern end lay outside the area of excavation. The central ridge of the building would have been supported on large posts and the walls constructed of smaller post and wattle and daub. The external walls are evidenced by continuous linear trenches in which traces of uprights for wattle panels spaced at 0.9m intervals were found. A second phase of the building appears to have been destroyed by fire as the foundation cuts of sections of the wattle walls on either side were filled with charcoal representing the burnt out remains of the bases of the wattle walls. Four equidistantly spaced large, roughly circular, pits in a line down the centre, 4.5m from the side walls, are the remains of large postholes which supported the central ridge of the building. Because of the maximum overall width of the building, some 9 metres in its latest phase, the substantial central timbers would have had been packed with stones around the base. As building stone seems to have been at a premium on the Headland during the Anglian period the posts and the associated stone packing would have dug out for reuse when the building was finally abandoned. The resulting large pits were back-filled with soil containing debris from high temperature industries – iron, lead and glass working – and slag, working waste and pieces of crucibles were found. The size and construction of this building suggests a mid-9th century date.

A narrow ditch on a different alignment, interpreted as a palisade trench, lay beneath the Anglian occupation. In profile this was very similar to the palisade trench found in Trench U3 and probably forms the western boundary of the enclosure around the late Iron Age round house.

Tony Wilmott, © English Heritage

Anglian building in Trench U2. The people are standing in the major central postholes and at the junctions of the walls. The palisade trench is marked by the ranging rods to the right of shot

Trench U3 (11m x 12m), located to the east of the LIA round house found in 2002, contained a large ditch, re-cut on several occasions, and a palisade trench. The final ditch in the sequence had a V-shaped profile with convex sides at the top; its surviving dimensions are 2.10m wide and 1.25m deep. This was very obviously cut through two earlier ditches and appeared to be filled with clean boulder clay from quite a low level. The primary ditch was a very shallow feature and probably had no defensive purpose, but may just have been for water management as the primary fill was very silty. The supply of water on the Headland seems to have been a problem with no natural sources available, and evidence for water collection and management has also been found in the areas excavated further to the west. Dating evidence in the ditch fills was very limited and it was initially thought that the ditch and palisade were associated and dated to the late Iron Age period, but a small fragment of glass recovered during environmental processing indicates that the ditch dates to the Anglian period. It may well mark the boundary of Anglian occupation on this part of the Headland as no further traces of activity of this date was found in the two trenches to the east. The smaller palisade trench (950mm wide and 570mm deep) proved to be on a slightly different alignment to the ditch; it had a V-shaped section with a slot in the base for locating the closely-spaced upright timbers. A few flint flakes were found in the fill.

Trench U4 (5m x 20m). Only ridge and furrow was found in this trench (despite a circular anomaly identified by the geophysical survey) showing that there never been occupation in this area.

Trench U5 (2m x 43m) contained the ephemeral remains of a nearly ploughed out round house and a deep V-shaped ditch. The ditch has maximum surviving dimensions of 1.10m in depth and 3.40m in width and runs north-south at this point; it is possible to see where it joins the modern cliff edge at right angles to the north and the geophysical survey has shown that it continues to the south before curving round to the west. It was virtually completely filled

with stones of various sizes and contained a large rectangular building stone dressed on five faces in its lowest fill. The iron chisel marks on five of its six surfaces make a date in the post Anglian period highly likely. Above this a piece of rock art was located. It seems possible that the quantities of stones represent a stone wall on one side of the ditch that were used to backfill this feature when the area became used for agriculture in the medieval or post medieval period, and the rock art boulder had been reused in this wall. Shallow parallel lines on lower edge of boulder resemble score marks from ploughing found on many stones on the Headland and it seems likely that it had been on or near the ground surface for many centuries before its final reuse and deposition. The second round house in this area was located on the edge of a natural dip or old stream course. Over the centuries ploughing has truncated this edge and the foundations of the round house were extremely shallow and ephemeral, all that survives is part of its curving wall foundation and the bottoms of two pairs of internal post holes. As with the other round house found in 2002 its entrance faced to the east.

The finds and general dating evidence recovered from the site are very limited and little help in dating the sequences. Most of the finds from the area of the Anglian building do not represent domestic living but derive from high temperature industrial activity which must having been taking place nearby. The most significant of these was glassworking and in addition to the fragments found in 2002 several pebbles of raw glass and dribbles and trails formed during the glass working process were found. Nearly all this material was recovered from an extensive sampling process established for this purpose. Evidence for domestic occupation in the area of the Anglian house is surprisingly limited when compared to that recovered from structures further to the west. Only a few pieces of pottery were recovered and although animal bone generally survives poorly in the clay soils of the Headland the recovery of only three sheep teeth is surprising. However, an unusual find was a very small piece of high quality flat gold thread of a type probably used in braid or edging. The absence of domestic debris in this area raises the question of what this large building was used for, or for how long it was occupied.

Rock art from Trench U5 (388 × 327mm)

Definite dates for many of the features and our interpretation of the evidence will have to await a programme of analysis and scientific dating being undertaken as part of the ongoing analysis of our work on Whitby Headland undertaken over the past 15 years.

Sarah Jennings and Tony Wilmott

Left: A high quality piece of flat gold thread

Below: glassworking debris

Ian Leonard and Mike Hesketh-Roberts, © English Heritage

NEW DISCOVERIES AND INTERPRETATIONS

Brutalism at Woolwich

A polytechnic building in the Brutalist style has an architectural link to the South Bank Centre.

Following the recent completion of the Clerkenwell volumes, the Survey of London is now turning its attention to two south London districts, Woolwich in the east and Battersea in the west. Woolwich is best known for its military establishments, the Arsenal, dockyard and a plethora of barracks, but its less familiar 'civilian' aspect has sites of equal interest. One such is the former campus of Woolwich Polytechnic, latterly part of the University of Greenwich.

The polytechnic, the second to be founded in the country, was established in 1891 in modest premises – a reworked and re-fronted house of the *c.*1820s. During the following century it expanded to encompass an entire island block in central Woolwich, resulting in a fascinating assemblage of largely purpose-built educational premises of various dates. These include the original converted house and gymnasium, as well as workshops, a hall and classroom ranges. Over half of the complex predates the Second World War, varying in the treatment of its different parts between Classical grandeur and simple utilitarianism. A substantial post-war extension, achieved, only after considerable

The Wellington Street elevation of the 1962-4 extension, photographed when newly built. Its appearance was largely determined by its internal spaces, such as ground-floor shop units and classrooms on the upper floors, as well as a preference for 'neutral' façades

Derek Kendall, © English Heritage

The freestanding stairs and v-shaped supports of the lecture theatre; the latter enable the structure to appear externally as if floating above the glazed lobby

delays and difficulties, in 1962-4, marks a radical stylistic break with the preceding buildings. Imbued with a 'brutalist' aesthetic, the extension was the work of the Schools Division of the London County Council's Architect's Department, then enjoying a notable period of creative experimentation.

The extension, designed in 1958-9, comprised two separate blocks on different streets, constructed with an *in situ* reinforced concrete frame and brick infill. Its arrangement was dictated by a complex brief that had to accommodate ground-floor commercial premises as well as a diversity of functional areas, including offices, refectory, a boiler house and classrooms. The architectural principles behind 'the New Brutalism', developed and espoused by Alison and Peter Smithson in the early 1950s, emphasised function over appearance and the 'honest' use of materials. In practice, particularly as developed by the LCC, this often translated into the use of board-marked concrete, blocky geometric forms, raised walkways and the refusal to impose a unifying external treatment. This was the case at Woolwich, where first-floor circulation and linking bridges between the buildings made particular sense because of the compromised ground floor and disparate site. The principal frontage on Wellington Street is relatively low-key; instead, the set-piece is a boldly handled lecture theatre, a cantilevered concrete box with a glazed foyer.

The design of the extension followed the usual practice of the LCC in the 1950s; it was carried out by a group of architects working beneath a team leader, in this instance George Trevett. A leading role seems to have been given to one team member, Ron Herron, who had previously worked on the well-received Sidmouth Street School (1957-9). In 1960 Herron joined the team working on the South Bank Centre, in many ways the apogee of the LCC Brutalist style, leaving in 1961 to achieve much greater fame as part of the experimental group Archigram. The South Bank Centre has come to be appreciated and valued (if not always loved), but Woolwich Polytechnic extension has remained obscure and under-appreciated.

Jo Smith

NEW DISCOVERIES AND INTERPRETATIONS

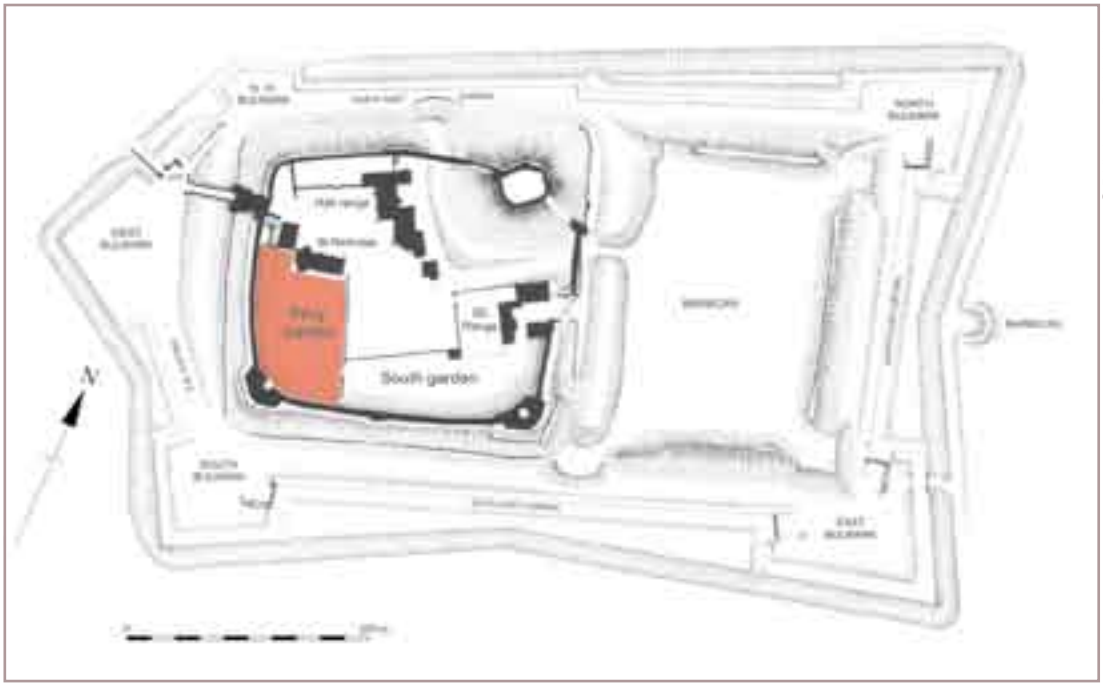
The 'Privy Garden' at Carisbrooke Castle reveals its secrets

Historical and archaeological research provides evidence for the re-design and re-interpretation of the walled garden.

Carisbrooke Castle, located on an isolated, steep-sided chalk hill is the only medieval castle on the Isle of Wight. The magnificent 12th century motte-and-bailey overlies a 10th-11th century burh-type fortification which was itself re-used as a Conquest-period ringwork. In the mid-13th century the castle became Isabella de Fortibus' principal residence and administrative centre for her vast estates. Her 23-year building programme established suites of high status accommodation, the layout of which is echoed in the buildings that survive today. In the 16th century Sir George Carey built a mansion on the site of the medieval kitchens. By this time the castle was the official residence first of the Captains and later Governors of the Isle of Wight, and remained so into the 20th century. It was taken into the care of the Office of Works in 1856 and is now under the guardianship of English Heritage.

In the south-west quadrant of the bailey is an enclosed space known as the Privy Garden, defined to the south and west by the medieval ramparts and curtain wall, to the north by St Nicholas' Chapel, a building erected in 1904 on the foundations of its 13th century predecessor, and to the east by a substantial wall. A project to re-design the Privy Garden is being undertaken as part of an English Heritage programme to upgrade visitor facilities. To inform that programme a detailed historical and archaeological study was undertaken between August and October 2006.

Although the great medieval castle at Carisbrooke had a 'herbary next the chapel' in 1287-8, its location is unknown.



Plan of Carisbrooke Castle. The Privy Garden is highlighted

The walled garden at Carisbrooke in 1851, a simple formal design of cultivated plots for vegetables and flowers, divided by pathways

Historical documents take us back only to 1723, when the walled area is annotated on a Board of Ordnance plan 'now a garden', perhaps indicating a former purpose (according to the Isle of Wight historian Sir Richard Worsley, writing in 1781, the enclosure had been a cemetery for St Nicholas' Chapel). Since that time it has remained a garden, depicted with trees in 1741 (an orchard?), as also on a map of 1793 when tree symbols accompany lines of dots, perhaps representing cultivated plots. By 1841, food was grown in the garden, as shown in an 1851plan. It remained a kitchen garden into the late Victorian period and is recorded on several photographic postcards with ivied walls and intensively-planted beds.

Change came when Princess Beatrice became governor in 1896. She transformed the garden into one purely for recreation and pleasure. In 1913 she made Carisbrooke her principal summer residence. By this time the castle was also open to the public as an historic monument. The Princess and the Office of Works reached an agreement whereby the latter would maintain the garden with public access allowed when she was not in residence. This is when the term 'Privy Garden' arose. The arrangement proved unsatisfactory; the garden remained unambitious and the public were never allowed in.

By the early 1920s the garden was mainly lawn with a perimeter path and border planting except on the south side, where trees grew on the rampart. In the 1930s spare plants were brought from Osborne. In 1934 a Works memorandum records that 'we have let the garden get in a very poor way'.

On initiation of the archaeological project, both earthwork, and geophysical survey indicated buried paths and flowerbeds, but the disturbed soils and litter within them obscured deeper and earlier features. Although there had been no previous archaeological excavation in the garden, an excavation just to the east (Trench Y5) in the 1970s revealed important archaeological evidence. This included three 6th century high-status burials, traces of 10th or 11th century structures, two late 11th century ringwork ditches, and 12th-13th domestic buildings.

Princess Beatrice in the walled garden at Carisbrooke Castle, probably in the 1930s

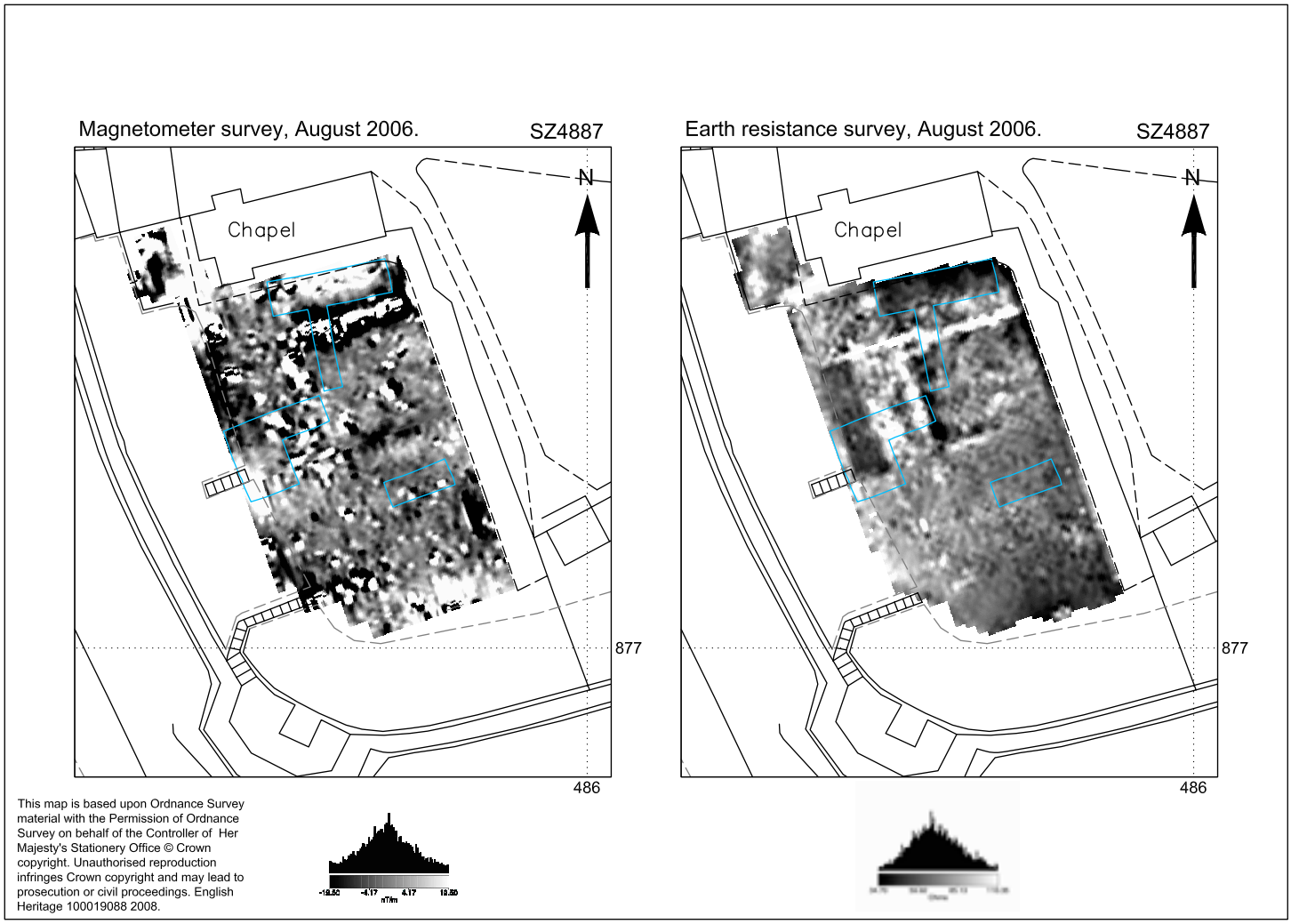
Did any of this activity extend into the Privy Garden? Was there a medieval cemetery? and how well did the later gardens survive? Three small trenches were positioned to examine selected features identified in the earthwork and geophysical surveys and to provide representative coverage of the area. Volunteers from the Island's metal detecting clubs assisted in the recovery of finds from the spoil-heaps.

The excavation demonstrated that the original hill-top sloped markedly from north to south. A small section of a probable Iron Age pit or ditch was recorded, the first prehistoric feature from the site, but no further evidence of the Saxon cemetery was found. However, a continuation of the outer ditch of the Conquest-period ringwork was revealed, running under the eastern end of St. Nicholas' Chapel, which strongly suggests that the Domesday chapel is unlikely to have been on this location.

During the medieval period the garden was not divided from the bailey, and various dumps of chalk and redeposited midden material, were laid down, particularly to the south. These were like similar deposits found in Trench Y5. Pits, post-holes and a beam-slot suggest ephemeral structures. A short length of an east-west stone-built foundation may represent a more substantial building or a wall dividing the area. There was no evidence of a medieval cemetery. By the 15th century the garden area was divided from the rest of the bailey, possibly by the existing east wall, as the thick deposits of greensand which characterised 15th century levelling in Trench Y5 were not encountered in our trenches. Instead, uncertainty dated dumps of chalk rubble and roof slate, which raised the level at the south end to that of the north, were succeeded by an 18th-century horticultural soil. This marks a fundamental change of use to an open space or garden associated with, to the north, a series of 18th century post- or planting-holes.

A thick horticultural soil of early 19th century date, possibly reworking earlier garden deposits, was cut by the axial gravel

Plan of the geophysical survey with the position of the excavation trenches indicated in blue



Brian Kerr, © English Heritage

View from the west rampart of the excavation trenches

paths which appear on the plan of 1851. Another east-west path which appeared to divide into two was of a different build and likely to be late 19th century. All but the perimeter path went out of use *c*. 1900 when the area was set to lawn. At this time three large rectangular flower-beds were established, two along the west side and another just south of the chapel. In 1998 these beds were levelled and turfed over.

This extensive historical and archaeological research has informed our approach to the development of the new garden. The most interesting time in the garden's development is considered to have begun in the last years of the 19th century, with Princess Beatrice as governor. A new garden at Carisbrooke, to be known as 'The Princess Beatrice Garden', based firmly on our understanding of the garden in the early to mid-20th century, will create a new and enchanting space within the castle grounds. A shortlist of landscape designers with experience of the restoration and recreation of gardens of this period has been invited to produce illustrative outline designs. Following selection of the successful designer and approval of a detailed design and specification, work on the garden is expected to commence in autumn 2008 with the hard landscaping and soil cultivations followed by the garden being planted in spring 2009.

English Heritage is grateful to the late Mrs Dorothy Frazer whose generous bequest and devotion to the Isle of Wight will enable the creation of the Princess Beatrice Garden for future generations to enjoy.

Annabel Brown, Louise Martin, Paul Pattison and Michael Russell

© English Heritage

Late 19th century east-west garden path. The wider west part is where it divides into two parallel paths

NEW DISCOVERIES AND INTERPRETATIONS

The discovery of a new 'rude stone monument' on Exmoor – the stone row at Warcombe Water

The discovery of a new lithic monument enhances knowledge of a prehistoric ritual landscape.

The lithic monuments of Exmoor were recognised by antiquarians in the early 17th century. Two publications in the first decade of the 20th century, '*The rude stone monuments of Exmoor and its borders, parts I and II*', by J F Chanter and R H Worth, established the general distribution and nature of Exmoor's standing stones and stone settings, realised their antiquity and called for their study and preservation. It was not until the late 20th century, however, that this study began, with the RCHME's (Royal Commission on the Historical Monuments of England) survey of the lithic monuments within Exmoor National Park. This survey, by N V Quinnell and C J Dunn, recorded eight stone rows, two stone circles and some 57 stone settings.

In 2006 Celia Haddon contacted the Exmoor National Park archaeologist with her discovery of a possible prehistoric stone row on a terrace to the west of Warcombe Water, south of Barbrook on the open moorland of Lynton Common; a site visit subsequently confirmed her discovery. Chanter and Worth had, in fact, already recognised the potential of this area:

> *'On the hill between Warcombe Water and West Lyn River, especially on its Northern slopes, are several standing stones of no great dimensions. These are rather widely scattered, but it is possible that careful search might be repaid. On the same hillside we found several flint chips and cores in the mole-heaps, and this neighbourhood has yielded some good stone implements'*[1]

Recording the stone row

Hazel Riley © English Heritage

The survey and record of the new stone row at Warcombe Water was used to form a training module for two postgraduate students on placement with EH and the Exmoor National Park Authority as part of the MA in Landscape Archaeology programme at the University of Bristol. Working with the EH Archaeological Survey and Investigation Team (Exeter), the two students, Heather Smith and Jane Wilson, received training in using differential GPS equipment to locate and survey archaeological sites on remote upland areas. They also experienced recording Exmoor's 'minilithic' archaeology with tape measures and a drawing board, producing a metrically accurate plan at 1:500 scale of the stone row, located to the National Grid, and a written and photographic record of the site. A walkover survey of the spur in between Warcombe Water and the West Lyn

River was carried out and a number of new archaeological features were discovered, including a pair of upright stones, an area of probable Bronze Age field clearance not far from some known Bronze Age hut circles and relict field system, together with some practice trenches resulting from the training of troops on this part of Exmoor in the build up to D-Day. A new stone setting (a geometric arrangement of small, upright stones, thought to be unique to Exmoor and to date from the later Neolithic period), discovered in 2005 on Trout Hill, within the former Royal Forest of Exmoor, was also recorded as part of the training module.

The discovery of the stone row at Warcombe Water brings the total number recorded within the Exmoor National Park to nine. A study of the known stone rows in 2001 divided the rows into two kinds: three long rows (280-420m) and five short rows (12-68m). The stone row at Warcombe Water, at 99m, makes this division rather less clear cut. The long fingers of open heath which stretch down towards the coast from the Chains between Barbrook and Farley Water are now each defined by a stone row: Thornworthy Little Common, Warcombe Water, Furzehill Common and Cheriton Ridge. Each sits within a prehistoric landscape of stone settings, paired and solitary upright stones and burial cairns and barrows. The spur between the West Lyn River and Warcombe Water is now defined by prehistoric ritual monuments: the paired stones and the stone row lie in similar positions on the west and east sides of the spur. Two barrows, now in enclosed land, mark the northern tip of the spur. The fragmentary remains of prehistoric field clearance to the east of the West Lyn River fits with the general distribution of prehistoric settlement remains on Exmoor described in 2001. The western side of Exmoor is characterised by hut circles with small areas of relict field systems and clearance features; the eastern side, centred on the Dunkery massif, contains evidence for more extensive field systems.

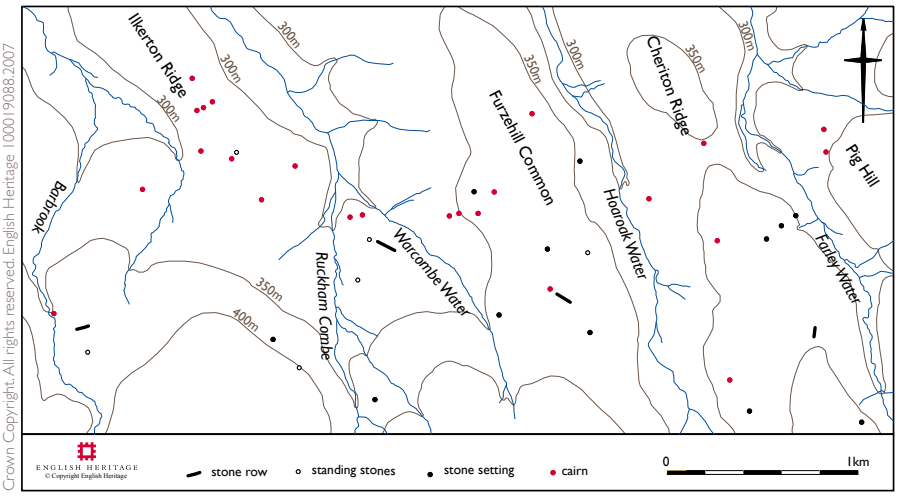
The new stone setting on Trout Hill adds another of these monuments to the remarkable area around the headwaters of Badgworthy Water. Badgworthy Hill, Great Tom's Hill, Pinford, Trout Hill and, in particular, Lanacombe contain a significant proportion of the known stone settings of Exmoor. This area, just to the north of the

Detail of the stone setting on Trout Hill

watershed between watercourses which flow into the Channel and the Atlantic, was of particular importance in the second and later third millennia BC. The potential for the discovery of more prehistoric features, both ritual and domestic, within the former Royal Forest of Exmoor and its surrounding commons, remains high. The size of the stones utilised in the lithic monuments and the fragmentary nature of the field systems and field clearance remains means that field survey is the only way to locate such features: for example, recent surveys of the unfinished hillfort of Shoulsbury Castle and the Exmoor National Park Authority's estate at Larkbarrow located two unrecorded prehistoric lithic monuments.

[1] Chanter, J F and Worth, R H 1906 'The rude stone monuments of Exmoor and its borders. Part II', Trans Devons Assoc **38**, 538 – 52

Hazel Riley



Thornworthy Common, Furzehill and Cheriton Ridge: stone rows and other prehistoric monuments

NEW DISCOVERIES AND INTERPRETATIONS

Blue plaques and the bicentenary of the abolition of the slave trade

Detailed address research is carried out into figures connected with the anti-slavery movement.

In anticipation of the bicentenary of the abolition of the transatlantic slave trade in 2007, consideration was given to the role that blue plaques might play in the commemorations planned for London.

Some existing blue plaques commemorate key figures of the anti-slavery movement, namely William Wilberforce (1759-1833), Zachary Macaulay (1768-1838) and the evangelical (and anti-slavery) Clapham Sect. In recent years, attention has focused on the contribution made by black anti-slavery campaigners. As in other instances, English Heritage staff have actively encouraged nominations, including those made by the Black and Asian Studies Association (BASA): Ignatius Sancho (1729?-80), Ottobah Cugoano (b. 1757?) and Olaudah Equiano (1745?-97). Detailed research was carried out into the lives and addresses of these important figures of the anti-slavery movement: unfortunately, no suitable addresses have yet been identified, though the research completed has borne fruit in other respects.

For more than fifty years it has been a strict criterion of the London scheme that plaques be placed on the actual buildings inhabited by the figure concerned, and that such buildings should survive largely unaltered. This principle underpins the scheme's objective of drawing public attention to the personal associations of historic buildings.

Ignatius Sancho spent much of his early life in the Duke of Montagu's household in Blackheath, before setting up a grocer's shop at 19 Charles Street, Whitehall; neither building is extant. Recent research has suggested that he may have grown up in Dartmouth Row, Blackheath, but no proof exists of this association. Olaudah Equiano lived in at least twelve different buildings in the capital, of which eight have been demolished. However, the remaining four addresses have not been positively identified, offering the prospect of commemoration if new evidence comes to light.

Ottobah Cugoano presented a different problem. Between 1784 and 1791 he lived and worked at 81 Pall Mall as a servant to the artists Richard and Maria Cosway; number 81 forms the central section of Schomberg House, which dates from 1698 and is listed grade II*. There is no space for a standard plaque on the façade; moreover, any addition would disrupt the symmetry of this rare survival of a seventeenth-century town mansion, albeit altered. The appropriateness of a plaque for a particular building is an overriding consideration in every blue plaque case.

A suitable address was found for another candidate, the abolitionist and Liberal MP Thomas Fowell Buxton (1786-1845). It was Buxton who led the parliamentary campaign against slavery after Wilberforce retired in 1823, and who headed the movement when slavery was finally abolished in the British Empire in 1834. Buxton was a partner in the East End brewery of Truman, Hanbury and Buxton, and it was at the Directors' House at 91 Brick Lane that his plaque was unveiled in September 2007 – the first to go up in this famous Spitalfields thoroughfare.

The Blue Plaques Team has also been active in offering guidance to independent initiatives in connection with the bicentenary. Advice was given, for example, to the

Lucy Chandler, a vice chairperson of Anti-Slavery International, unveils the plaque to her ancestor Thomas Fowell Buxton

Friends of Greenwich Park on the design and wording of the stone tablet celebrating the achievements of Ignatius Sancho, which was placed on the one surviving fragment of Montagu House in Blackheath.

Given that black anti-slavery campaigners now occupy their rightful place at the centre of the story of slavery and its abolition, it is a pity that no suitable surviving addresses have so far emerged for an English Heritage blue plaque to Cugoano, Equiano or Sancho. A positive outcome, however, has been the assembly a substantial body of work, based on wide-ranging and detailed primary research, about the places in London connected with these figures. Many of the sites identified will be visited on a historical walk scheduled for the autumn, to be led by Dr Susan Skedd, covering London locations connected with Equiano. It is also satisfying to report that a plaque to the Shakespearean actor Ira Aldridge (1807-67) went up in 2007 as a result of English Heritage's fruitful collaborative relationship with BASA, and that the plaque to the Jamaican nurse Mary Seacole (1805-81) was re-erected in Soho Square.

Susan Skedd and Howard Spencer

NEW DISCOVERIES AND INTERPRETATIONS

Working glass the Roman way

Experimental archaeology helps in the interpretation of site finds of glassworking debris.

Mark Taylor and David Hill are glassmakers who specialise in making Roman-style glass vessels and artefacts. Research and experimentation feature strongly in their efforts to understand the techniques of Roman glass production. In 2005 and 2006 they undertook their most ambitious project yet, building two experimental wood-fired furnaces. The designs were based on Roman archaeological remains and also representations of furnaces, for example on oil lamps. They were circular or oval in plan, with a sunken firing chamber. The most heavily used of the experimental furnaces was the "pot furnace" design, so-called because the molten glass was contained in a number of ceramic pots on an internal shelf within the furnace. The glassworker (Mark) would remove a gather of glass from a pot by inserting a gathering (or blowing) iron through one of the three gathering holes situated around the walls of the furnace.

The pot furnace at an early stage of construction, built with ceramic roof tiles and clay daub. The opening at the front is the stoke hole, which leads to the slightly sunken firing chamber

The pot furnace at dusk, with flames being drawn into the stoke hole at the front, gathering holes to the left and right (and another at the rear) and a small vent in the top of the domed roof. Behind the pot furnace can be seen the second smaller experimental furnace with an adjoining oven for annealing the glass

Mark continued to work upon the glass whilst seated in front of the same gathering hole, returning the glass to the gathering hole for reheating at intervals. Many aspects of the pot furnace design and structure were found to be dictated by the routine practises of the glassworkers. For example the gathering holes needed to be set at a certain height in order for the glassworker to be able to gather glass from a seated position. This in turn dictated the height that any glass pot would need to be placed on the inside of the furnace.

Mark and David used a blue-green glass based on Roman glass compositions, which was pre-melted in a modern gas-fired furnace then fed into the pot furnace as small chunks. They used basic wooden and metal tools and ceramic moulds, based as far as possible on Roman examples. With practice they produced a range of free-blown, mould-blown and cast objects, including phials, oil flasks, bottles, beakers, mosaic and ribbed bowls and even window panes. Mark relied upon working closely with the stoker, informing him whenever he particularly needed more heat for the manipulation of the glass. In the two three-week projects, the furnaces together consumed a total of 23 tonnes of wood (14 tonnes in 2006, 9 tonnes in 2005), and required stoking day and night. The project was visited by many members of the public, archaeologists, glass specialists and glassworkers.

The waste left after the experiments, including pieces of glass and fragments of furnace structure, ash and charcoal, bore a striking resemblance to waste material recovered during archaeological excavations from sites where glass working had taken place. Samples of the glass-working waste were analysed at the English Heritage Archaeological Sciences Laboratory in Portsmouth. The results showed how the different types of waste had formed and that the waste gases and ash from the wood-fuel burnt in the furnace had reacted with the furnace walls, the pots and even the glass to varying degrees, changing the composition

The Roman Glassmakers: Mark works the glass (right) with the assistance of David (left). A partly formed glass vessel is on the end of the blowing iron, which Mark supports on wooden thigh-boards. A selection of glassworking tools are to hand and fuel is piled in the background ready for use

of these materials. These changes can now be taken into account when interpreting archaeological material from glassworks and also from other industries that used wood-fired furnaces.

The project received funding from English Heritage (Historic Environment Enabling Programme), the Association for the History of Glass, Andante Travels, Project Workshops and SE Validation Ltd. The furnace experiments and the results of the scientific analyses will be published in a forthcoming issue of the Journal of Glass Studies, Volume 50, 2008. More information can also be found at the Roman Glassmakers website www.romanglassmakers.co.uk.

Mark Taylor, David Hill and Sarah Paynter

Right: This blown vessel was attached to a "pontil iron" at the base before being separated from the blowing iron, to leave a rough rim. The vessel was then decorated and finished, reheating it at intervals in the gathering hole, as shown here

Top right: Gathers of hot glass are used to make trailed decoration or to apply handles to blown vessels

Left: A selection of blown vessels made during the experiments

Right: The fragments of waste glass surrounding the furnaces (much of which was recycled) resemble the material found at archaeological sites where glassworking took place in the past

Ascott Park, Oxfordshire

A pair of roadside gate piers show the location of a well-preserved historic landscape.

On the busy B480 Oxford to Watlington Road, between the villages of Stadhampton and Chalgrove, is a scruffy lay-by, beside which stand incongruously a set of fine late 17th-century gate piers. In the field behind them two lime avenues create a vista of nothing. The limes should frame the view of a smart 17th-century country house, the gate piers forlorn remnants of the formal entrance to both house and park; but the house at Ascott was destroyed by fire in 1662 before construction was complete and the landscape around it was virtually fossilised at that point in time.

Though it is crossed by a major footpath, this historic park is not well known and has attracted relatively little research interest. Historic details of this landscape have now been teased out through geophysical survey (by Roger Ainslie), aerial photography, analytical earthwork survey and historic buildings investigation by English Heritage on behalf of the Oxfordshire Buildings Trust, in advance of their programme of repair works and to inform public presentation of the site.

Earthworks of medieval settlement can be seen at top right of the aerial photograph and there was a chapel in the area just above the upper lime avenue, towards the left of the picture. The two manors of Ascott were brought into single ownership by the Dormer family in the 16th century and they began to develop a formal designed landscape. The principal survivor of this phase is a very fine brick-built octagonal dovecot seen near the centre of the aerial photograph. A second octagonal building beyond it appears to form a pair but is in fact at least 50 years later in date and was possibly a gazebo or banqueting house added to complement the earlier dovecote. In the 1650s Sir William 'the Splendid' Dormer began to build a new house with formal gardens, arranged symmetrically around an axis which ran from the gate piers next to the road, through the house, the position of which is marked by the square depression in the centre of the picture; behind this a massive terrace, surviving as a rectangular mound, gave views over garden compartments to a series of very elaborate formal ponds now hidden within the woodland to the right of the picture.

NMR 24480/22. © English Heritage

Aerial photograph of Ascott Park from the west; faint cropmarks in the upper left suggest that the lines of the formal avenues were carried out into the wider landscape

A contemporary plan of the layout suggests that the two octagonal buildings – although the axis of the new design may have been derived from their location – were earmarked for demolition. However, Sir William and his heirs lost heart when their fashionable new house was gutted and they abandoned the site, leaving it as an evocative ghost land of pasture and woodland, where the remains of several centuries of activity can still be traced by careful observation.

Mark Bowden, © English Heritage

Surveying garden earthworks beside the late 16th-century dovecot, which is an exceptional example of its type and date

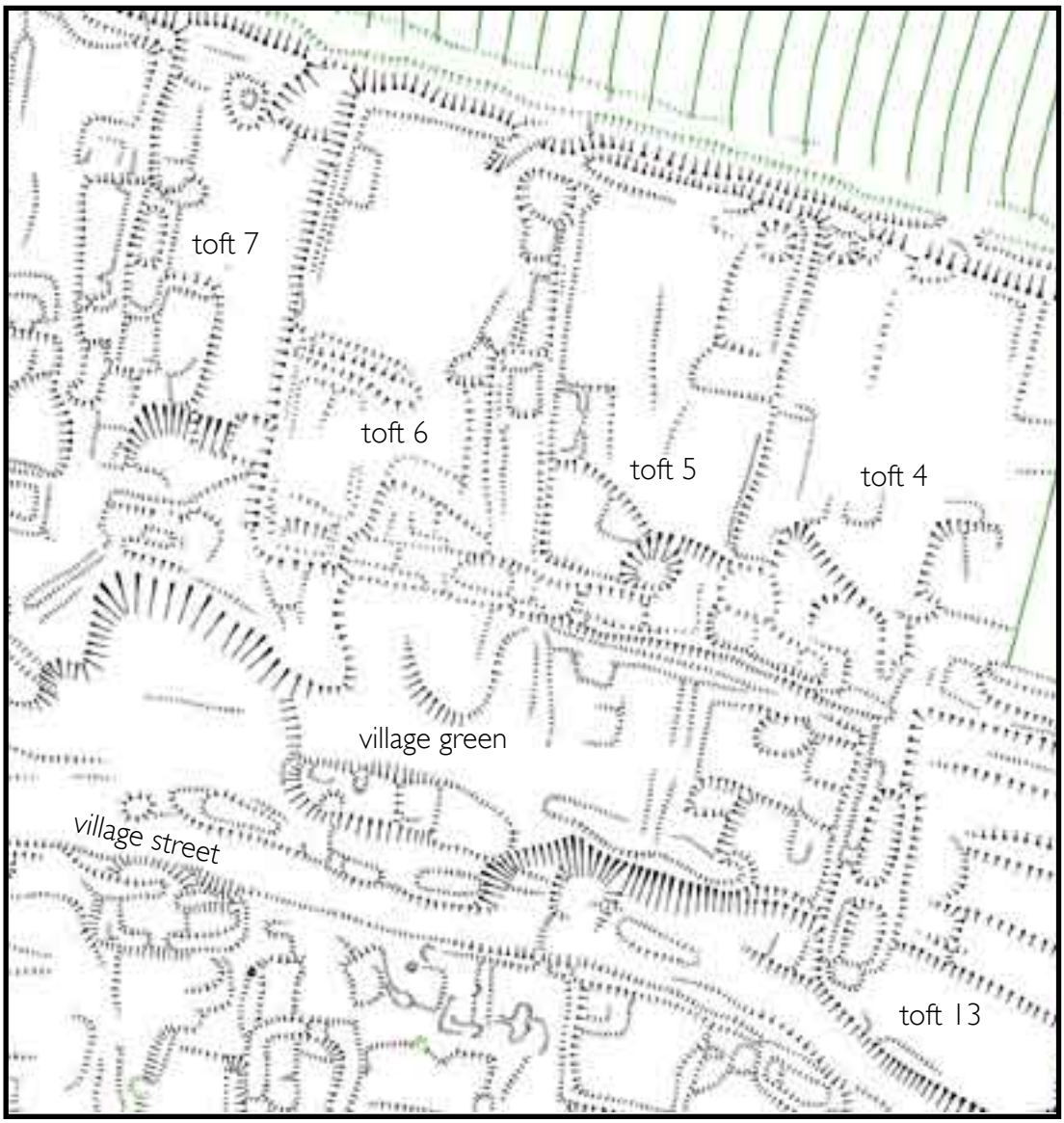
Mark Bowden, Barry Jones and Damian Grady

PROFESSIONAL TRAINING

An EPPIC tale

One EPPIC placement holder recounts her experience of the scheme.

In March 2007 I successfully applied for a one-year training placement with the Archaeological Survey and Investigation team in York as part of the English Heritage Professional Placements in Conservation (EPPIC) scheme. The EPPIC scheme has been running since 2003 and is an English Heritage, IFA and IHBC initiative to provide work-based learning opportunities in the historic environment sector. Each placement is provided and supervised within English Heritage, but is administered by the IFA. The placements, housed in several different specialist teams, are designed to train individuals with some experience of working in the historic environment and who want the opportunity to develop their skills. During 2007/8 there were six placement holders based in Archaeological Investigation in Cambridge and York, Architectural Investigation in Cambridge and Swindon, Aerial Survey and Investigation in York and Architectural Graphics in London.



Earthwork plan of the deserted medieval village at Ulnaby, High Coniscliffe, Co. Durham

Catherine Grindey © English Heritage

David Went, © English Heritage

Learning survey techniques at Cow Close, Co. Durham, with Stewart Ainsworth and Abby Hunt

I first heard about the EPPIC scheme in November 2006 and immediately realised what a good training opportunity it presented. Following a return to archaeological excavation after finishing my MSc at Bournemouth University I had been searching for an archaeological position where I could develop my analytical and report writing skills while still getting the opportunity to do fieldwork. I had over 4 years experience working in excavation, archives and the Historic Landscape Characterisation of Bedfordshire. This had helped to confirm my interest in landscape archaeology, but I had not yet found exactly the area that I wanted to work in. The EPPIC scheme would enable me to develop the proper skills I needed and build upon the experience I already had.

Since starting the placement I have been exposed to a wide variety of site types, for which different survey equipment and methodologies have been appropriate. I have worked on several projects that have enabled me to learn a variety of survey methods from the basic plane table and alidade method on a Roman camp at Cow Close, Co. Durham, through total station survey at Force Crag mine, Cumbria to using the survey grade GPS equipment to map the possible Neolithic enclosure at Hallin Fell, Cumbria.

I have also had opportunities to work with members of the public at the Festival of History and National Archaeology Week events, train in first aid and produce risk assessments and to give guided tours based on the research I have been involved in.

The most important skill I have developed concerns the interpretation of earthworks. I have gained experience by shadowing members of the team onto a variety of archaeological sites and landscapes. The main project that I have worked on has been carrying out the earthwork survey and historical research into the deserted medieval village and manorial site at Ulnaby, Co. Durham. This has allowed me to participate in a project from the initial reconnaissance through to production of the earthwork plan, analysis and plotting of aerial photographic evidence, writing the final report and to take the lead in delivering the results to the local community.

This year has proven to me that continuing to work in landscape investigation is what I really want for my career. Whatever happens I anticipate carrying forward and building upon the skills and experiences that I have gained during my EPPIC year.

Catherine Grindey

NOTES & NEWS

A round-up of activities and developments showing some of the scope and variety of projects that are ongoing in the Research Department.

SHOT FROM ABOVE

During and after the Second World War the RAF undertook a remarkable aerial survey, mapping the whole of the British Isles. Published here for the first time, a selection of these photographs focusing on London reveals the havoc wreaked by the Luftwaffe. Earlier historic aerial views from the National Monuments Record and the Royal Aeronautical Society – from early balloon photos to images from the 1930s – are also included in the book. Just as remarkable are the contemporary shots, taken from a helicopter by English Heritage's aerial reconnaissance team led by Damian Grady, who have either recreated these views or produced ones that complement the earlier photographs. The historic shots and their modern equivalents show us a city of constant change. Fascinating commentary is provided by London historian Steven Brindle, who details the remarkable transformation the city has undergone during the last 60 years.

Damian Grady

HAND-HELD GPS HELPS AERIAL SURVEY TEAM

The hand-held GPS equipment described in *Research News 7* is proving a practical help to the work of the Aerial Survey and Investigation team. In recent months the Swindon team have started to use the hand-held GPS as a convenient way for locating and checking archaeological features on the ground. A site where this technique has proved particularly useful is the Iron Age hilltop enclosure at Highdown near Worthing which was investigated using a combination of ground-based and aerial landscape survey.

Cover of *Shot from Above*

Rene Rodgers, Steven Brindle and Damian Grady at the launch of *Shot from Above*

Chris Dunn, © English Heritage

Hand held GPS in use

The survey of the National Trust owned land at Highdown was part of English Heritage's work in the proposed South Downs National Park. Sarah Newsome and Dave Field carried out a detailed ground survey of the hilltop enclosure and immediate environs and Helen Winton produced an assessment and plot of a wider area from aerial photographs. The AP plot covered parts of a possible prehistoric field system, extensive medieval and/or post medieval ploughing and the, now removed, infrastructure associated with a World War Two radar station based in the hilltop enclosure. We had a good correlation of survey results where our areas overlapped and field visits and discussions with Sarah and Dave were used to assist interpretation and to identify anything that required further ground based survey. Highdown hill is in a fantastic, but very exposed, position and these field visits were carried out in high winds and rain showers and the usual plans and copies of aerial photographs were difficult to use in these conditions. Therefore the hand-held GPS proved useful in very simple terms as it was waterproof and easy to carry and swap between Sarah and I. However, where it really came into its own was in the walk over of the AP plot in real time and space. The hand-held GPS made this process far easier as we could be sure that we had correctly identified features from the AP plot because we could follow ourselves on screen as we walked over the earthworks especially where they were obscured by steep terrain, bad lighting conditions, modern paths, badger setts or ploughing associated with grassland improvement. Finally the GPS was a great improvement because details added in the field were integrated immediately into the digital AP plot.

The survey at Highdown has highlighted the uses of the hand-held GPS in understanding and adding additional detail to earthworks plotted from aerial photographs and it has further potential uses, for example recording finds, like the Bronze Age pottery found in the numerous molehills at Highdown. There is also real potential for use with cropmark plots to examine subtle details of the topographical location of sites not visible on the ground, or in more practical terms with the immediate integration of results from activities such as field walking.

Helen Winton

The Investigative Conservation Guideline booklet

INVESTIGATIVE CONSERVATION GUIDELINES

These newly published guidelines are aimed at archaeologists, finds specialists and museum curators who are involved in the planning and publication of archaeological projects with an expected finds assemblage, as well as finds liaison officers and other museum staff advising metal detectorists. They illustrate the range of assistance that investigative conservation can bring to many projects and how these conservation processes can be incorporated into a project design. They also provide a guide to aspects of good conservation practice and indicate what project managers should expect from conservation practitioners.

These guidelines cover:

- *A guide to good practice for investigative conservation from projectplanning to publication*
- *Examples of the potential information that can be obtained from archaeological finds and the techniques used to achieve this*
- *Where to get help*

Jacqui Watson

DRAWING THE DOOMSTONE

Among the examples of medieval sculpture displayed in the undercroft of York Minster is the Doomstone, a large intricately-carved stone slab found in a nearby garden in 1904. It carries a dramatic vision of hell with hideous devils tormenting the souls of the dammed and probably dates to the rebuilding of the Minster by Archbishop Roger of Pont-l'Eveque in the second half of the 12th century. Judith Dobie of the EH Archaeological Graphics team is making the first detailed drawing of the stone as part of the research funded by English Heritage into the early development of the medieval Minster. The drawing work has brought out many details of the design that were not clearly seen or understood before including traces of paint suggesting the surface was originally coloured. Judith's completed drawing, along with photographs taken by English Heritage photographer Bob Skingle, will be published by architectural historians Christopher Norton and Stuart Harrison as part of their re-assessment of the purpose and meaning of this remarkable survival.

Trevor Pearson

Bob Skingle, © English Heritage

Judith Dobie drawing the Doomstone *in situ* in York Minster

Bob Skingle, © English Heritage

Close-up of Judith at work

RESEARCH DEPARTMENT REPORT SERIES: January – July 2008

1. Brown, A, Toms, P S, Howard, A J, Carey, C and Challis, K, 'Trent/Soar River Confluence: Optically Stimulated Luminescence Dating of Single Grains of Quartz'
2. Toms, P S, Brown, A, Hosfield, R T and Basell, L, 'Palaeolithic Rivers of South West Britain: Optically Stimulated Luminescence Dating of Residual Deposits of the Proto-Axe, Exe, Otter and Washford'
3. Bridge, M C and Miles, D W H, 'Westminster Abbey, London: Tree-Ring Dating of the Chests and Fittings
4. Martin, C, 'Apethorpe Hall, Apethorpe, Northamptonshire. Record of Areas Opened Up. Volume 2'
5. Alexander, M, 'Fort Pitt, Chatham, Kent: An Earthwork Analysis of Jackson Recreation Ground'
7. Penton, S, 'Cliff's End Farm, Ramsgate, Kent: Investigative Conservation of Early Anglo-Saxon Grave Finds'
8. Penton, S, 'Southampton Friary: Analytical Investigation of a Medieval Tuning Peg'
9. Bridge, M C, 'St Andrew's Church, Cheddar, Somerset: Tree-Ring Analysis of Further Timbers from the Nave Roof and Ceiling'
10. Howard, R E and Arnold , A J, 'The Old Standard (Nos 1 and 2), Little Keigwin (No 5), and Keigwin (no 7), Keigwin Place, Mousehole, Cornwall: Tree-Ring Analysis of Timbers'
11. Carpenter, E, 'The South Downs NMP Pilot Area 1: Worthing to the Weald'
13. Oswald, A, Jecock, M and Grindey, C, 'Ulnaby, County Durham: An Archaeological Survey and Investigation of the Deserted Medieval Village'
14. Bridge, M C, 'St Mary Magdalen's Church, Wiggenhall St Mary Magdalen, Norfolk: Tree-Ring Dating Analysis of Timbers'
15. Bridge, M C, 'Church of St Andrew, Soham, Cambridgeshire: Tree-Ring Analysis of Timbers from the Nave Roof'
16. Martin, C, 'Apethorpe Hall, Apethorpe, Northamptonshire: Apethorpe Hall: St John's School and Community Home'
17. Bridge, M C, 'Church of St Helen, Little Eversden, Cambridgeshire: Tree-Ring Analysis of Timbers from the Bellframe and Windlass'
18. Penton, S, 'Cummitton, Cumbria: Analytical Investigation of Jet-Like Objects from a Viking Cemetery'
19. Riley, H, 'Long Barrows on the South Dorset Ridgeway: A Survey by English Heritage and the Ridgeway Survey Group'
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